

WHAT IS CLAIMED IS:

1. A device for attaching at least three electrodes to a subject for stimulating abdominal muscles of the subject, comprising:

an attachment means for extending around the torso of the subject;

a main locating means on the attachment means for locating a central electrode of the at least three electrodes adjacent the umbilicus of the subject; and

two secondary locating means on the attachment means disposed on respective opposite sides of the main locating means for locating two corresponding side electrodes of the at least three electrodes spaced apart from the central electrode in a general direction towards a corresponding one of the right and left mid-axillary lines of the torso intermediate the rib cage and corresponding right and left iliac crests;

whereby, by applying at least one pulsed signal to the subject through the respective central and side electrodes, abdominal muscles of the subject are stimulated.

2. The device as claimed in claim 1, wherein the secondary locating means are disposed on the attachment means for locating the respective side electrodes towards the mid-point of the corresponding mid-axillary line between the rib cage and the corresponding iliac crest.

3. The device as claimed in claim 1, wherein the secondary locating means are disposed on the attachment means for locating the respective side electrodes adjacent the corresponding mid-axillary line.

4. The device as claimed in claim 3, wherein the secondary locating means are disposed on the attachment means for locating the respective side electrodes adjacent the mid-

point of the corresponding mid-axillary line between the rib cage and the corresponding iliac crest.

5. The device as claimed in claim 1, wherein the main locating means is disposed on the attachment means for locating the central electrode on the umbilicus and extending around the umbilicus.

6. The device as claimed in claim 1, wherein the main locating means is disposed on the attachment means for locating the central electrode on the umbilicus and extending completely around the umbilicus.

7. The device as claimed in claim 1, wherein the main locating means is disposed on the attachment means for locating the central electrode on the umbilicus, but with a greater area of the central electrode located below the umbilicus than above the umbilicus.

8. The device as claimed in claim 1, wherein the main locating means is disposed on the attachment means for locating the central electrode adjacent but not on the umbilicus.

9. The device as claimed in claim 1, wherein the main locating means is disposed on the attachment means for locating the central electrode below the umbilicus.

10. The device as claimed in claim 1, wherein the main locating means is disposed on the attachment means for locating the central electrode above the umbilicus.

11. The device as claimed in claim 1, wherein the main locating means is disposed on the attachment means for locating the central electrode both below and above the umbilicus.

12. The device as claimed claim 1, further comprising a reference means provided on the attachment means for locating the attachment means on the torso relative to an anatomical reference.

13. The device as claimed in claim 12, wherein the reference means is provided for locating the attachment means circumferentially around the torso.

14. The device as claimed in claim 12, wherein the reference means is provided for locating the attachment means vertically along the torso.

15. The device as claimed in claim 12, wherein the main locating means acts as the reference means for locating the attachment means relative to the anatomical reference provided by the umbilicus.

16. The device as claimed in claim 1, wherein the main locating means comprises a first main locating means and a second main locating means for locating respective corresponding first and second central electrodes adjacent the umbilicus of the subject.

17. The device as claimed in claim 16, wherein the first main locating means is provided for locating the first central electrode above the umbilicus, and the second main locating means is provided for locating the second central electrode below the umbilicus.

18. The device as claimed in claim 1, further comprising two sets of at least two secondary locating means disposed on the respective opposite sides of the main locating means for facilitating selective location of the respective side electrodes for accommodating different girths of torso.

19. The device as claimed in claim 18, wherein each set of secondary locating means comprises three secondary locating means.

20. The device as claimed in claim 1, wherein portions of the attachment means on respective opposite sides of the main locating means between the main locating means and the corresponding secondary locating means are formed of resilient material for facilitating resilient

stretching of the attachment means between the main and corresponding secondary locating means.

21. The device as claimed in claim 1, wherein the attachment means is formed of a resilient material for facilitating stretching of the attachment means around the torso, the resilient portions of the attachments means being of greater stretchability than that of the rest of the attachment means.

22. The device as claimed in claim 1, further comprising a main electrically conductive contact means provided on the attachment means corresponding to each main locating means for receiving the at least one pulsed signal and for relaying the signal to the corresponding central electrode.

23. The device as claimed in claim 22, wherein each main contact means is located within the corresponding main locating means.

24. The device as claimed in claim 1, further comprising two secondary electrically conductive contact means provided on the attachment means for receiving the at least one pulsed signal and for relaying the signal to the respective corresponding side electrodes.

25. The device as claimed in claim 24, wherein each secondary contact means is located adjacent the corresponding secondary locating means or the corresponding set of secondary locating means.

26. The device as claimed in claim 24, wherein each secondary contact means is located adjacent the corresponding secondary locating means so that irrespective of which secondary locating means is selected for locating the corresponding side electrode the side electrode is in electrically conductive engagement with the secondary contact means.

27. The device as claimed in claim 1, wherein each main and secondary locating means is provided as a visually perceptive locating means.

28. The device as claimed in claim 1, wherein each main and secondary locating means is formed as a corresponding locating mark on the attachment means.

29. The device as claimed in claim 28, wherein each locating mark defines an outline of a part of the periphery of the corresponding electrode corresponding to the locating means.

30. The device as claimed in claim 28, wherein each locating means is adapted for locating a patch type electrode.

31. The device as claimed in claim 1, wherein the at least three electrodes are formed as a removable part of the device.

32. The device as claimed in claim 31, wherein each electrode is a patch type electrode.

33. The device as claimed in claim 31, wherein each side electrode is sized to cover at least a portion of the corresponding lower thoracic nerves and the corresponding first and second lumbar nerves.

34. The device as claimed in claim 31, wherein each central electrode is sized to extend substantially across the rectus abdominus muscle.

35. The device as claimed in claims 31, wherein each electrode defines an area of contact over which the electrode makes direct electrical contact with the subject, the area of contact of each side electrode being such as not to exceed the area of contact of the or both central electrodes.

36. The device as claimed in claim 35, wherein the area of contact of each side electrode does not exceed one third of the area of contact of the central electrode.

37. The device as claimed in claim 35, wherein each side electrode is of width in a circumferential direction relative to the torso of the subject in the range of 50 mm to 150 mm, and is of length in a vertical direction relative to the torso of the subject in the range of 80 mm to 120 mm.

38. The device as claimed in claim 31, further comprising a first electrically conductive coating provided on one side of each electrode for electrically connecting the electrode to the corresponding contact means.

39. The device as claimed in claim 38, wherein the first coating is a gel type coating containing an electrolyte solution for enhancing electrical contact between the electrode and the corresponding contact means.

40. The device as claimed in claim 38, further comprising a second electrically conductive coating provided on the other side of each electrode for electrically connecting the electrode to the torso of the subject.

41. The device as claimed in claim 40, wherein the second coating is a gel type coating.

42. The device as claimed in claim 40, wherein the second coating is an adhesive coating.

43. The device as claimed in claim 40, wherein the first coating is an adhesive coating.

44. The device as claimed in claim 43, wherein the bond strength of the first coating to the attachment means is greater than the bond strength of the second coating to the torso for facilitating removal of the attachment means and the electrodes located thereon from the torso of the subject.

45. The device as claimed in claim 40, wherein the electrodes are pre-coated with the respective first and second coatings.

46. The device as claimed in claim 1, further comprising a receiving means provided in the attachment means for receiving a signal generating means for generating the at least one pulsed signal.

47. The device as claimed in claim 46, further comprising a main electrical connecting means extending between the receiving means and each main contact means for relaying the at least one pulsed signal from the signal generating means to the corresponding main contact means.

48. The device as claimed in claim 47, further comprising a secondary electrical connecting means extends between the receiving means and each secondary contact means for relaying the at least one pulsed signal from the signal generating means to the corresponding secondary contact means.

49. The device as claimed in claim 48, wherein each electrical connecting means is located within the attachment means.

50. The device as claimed claim 46, wherein the receiving means is a releasable receiving means for releasably receiving the signal generating means.

51. The device as claimed in claim 50, wherein the receiving means receives the signal generating means with a snap fit action.

52. The device as claimed in claim 1, wherein the attachment means comprises a belt.

53. The device as claimed in claim 52, further comprising a securing means provided on the belt for securing the belt around the torso of the subject.

54. The device as claimed in claim 1, further comprising a main fastening means provided corresponding to each main locating means for fastening a corresponding central electrode to the attachment means adjacent the corresponding main locating means.

55. The device as claimed in claim 54, further comprising two secondary fastening means provided in the attachment means for fastening the respective side electrodes to the attachment means adjacent the corresponding selected secondary locating means.

56. The device as claimed in claim 55, wherein each fastening means comprises a stud fastener.

57. The device as claimed in claim 56, wherein each stud fastener comprises a female part and a male part, the female part being secured to the attachment means.

58. The device as claimed in claim 57, wherein each stud fastener is electrically conductive so that the female part of the stud fasteners form the corresponding contact means.

59. The device as claimed in claim 57, wherein an exposed surface of the female part of each stud fastener is of electrically insulating material.

60. The device as claimed in claim 59, wherein the exposed surface of each female part of each stud fastener is coated with an electrically insulating coating.

61. The device as claimed in claim 56, wherein the stud fastener comprises a male part for attaching to a corresponding electrode, and a female part for attaching to the attachment means.

62. The device as claimed in claim 61, wherein the male and female parts of the stud fastener engage each other with electrically conductive engagement.

63. The device as claimed in claim 61, wherein an exposed external surface of the female part of the stud fastener which abuts the male part of the stud fastener is of electrically insulating material.

64. The device as claimed in claim 63, wherein the electrically insulating material is provided by an electrically insulated coating on the exposed abutting surface.

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